

What is claimed is:

1. A method of producing an integrated transgene in an avian cell comprising:
5 introducing a nucleic acid comprising a non-lethal marker gene into a n avian cell by electroporating; and
allowing the cell to undergo a cellular division;
thereby producing an integrated transgene in an avian cell.
- 10 2. The method of claim 1 comprising allowing the cell to undergo a division in the presence of chick embryo extract.
3. The method of claim 1 wherein the transgene is stably integrated.
- 15 4. The method of claim 1 wherein the marker gene is a fluorescent expression marker.
5. The method of claim 1 wherein the marker is a fluorescent protein expression marker.
- 20 6. The method of claim 1 wherein the marker is an green fluorescent protein expression marker.
7. The method of claim 1 wherein the marker is an antibiotic
25 resistance gene.
8. The method of claim 1 wherein the marker is puromycin resistance.
- 30 9. The method of claim 1 wherein the avian cell is a blastodermal cell.

10. The method of claim 1 wherein the electroporating introduces a double stranded break in a nucleic acid.

11. A method of producing a transgenic avian comprising injecting a cell of claim 1 into an avian embryo.

12. The method of claim 11 wherein the cell is injected into the embryo after passage.

13. The method of claim 11 wherein the embryo is a stage X embryo.

14. The method of claim 11 wherein a coding sequence of the transgene is expressed in the blood of the transgenic avian.

15. The method of claim 11 wherein a coding sequence of the transgene is expressed in the sperm of the transgenic avian.

16. The method of claim 11 wherein a polypeptide encoded by a coding sequence of the transgene is present in egg white produce by the transgenic avian.

17. The method of claim 11 wherein the coding sequence is for a light chain or a heavy chain of an antibody.

18. The method of claim 17 wherein the antibody is a human antibody.

19. The method of claim 11 wherein the coding sequence is for a cytokine.

20. The method of claim 19 wherein the cytokine is interferon.

21. A method of screening for nucleic acid integration in a cellular genome comprising:
transforming a nucleic acid comprising a marker into a recipient avian cell
5 and
determining if the nucleic is present in an equal copy number in cells of a colony produced by the recipient avian cell.
thereby screening for nucleic acid integration in a cellular genome.
- 10 22. The method of claim 21 wherein the transforming is accomplished by electroporation.
23. The method 21 wherein the nucleic acid is DNA.
- 15 24. The method of claim 21 wherein an expression construct comprises the nucleic acid.
25. The method of claim 21 wherein the cell is an avian blastoderm cell.
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26. The method of claim 21 wherein the marker is a fluorescent marker.
27. The method of claim 21 wherein the marker is a fluorescent
25 protein expression marker.
28. The method of claim 21 wherein the marker is an green fluorescent protein expression marker.
- 30 29. The method of claim 21 wherein the determining if the nucleic is present in an equal copy number in cells of a colony produced by the recipient avian cell is accomplished based on light emission.

30. The method of claim 21 wherein the determining if the nucleic acid is present in an equal copy number in cells of a colony produced by the recipient avian cell is accomplished by determining if a marker is homogeneously present in cells of a colony produced by the recipient cell.

31. The method of claim 29 wherein the marker is present homogeneously in cells of a colony produced by the recipient cell indicating the nucleic acid is integrated in the genome of the recipient host cell.

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32. The method of claim 29 wherein the marker is present non-homogeneously in cells of a colony produced by the recipient cell indicating the nucleic acid is not integrated in the genome of the recipient host cell.